



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
(Dundigal-500043, Hyderabad)

B.Tech V SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2022

Regulation:UG20

ANALYSIS OF STRUCTURES

(CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Explain in detail about the types of arches with neat sketches. Differentiate between the symmetrical arch and unsymmetrical arch. [BL: Understand| CO: 1|Marks: 7]
- (b) Find the horizontal thrust for two hinged parabolic arch as shown in Figure 1. The moment of inertia at section $I_c \sec \theta$, where θ is the slope and I_c is moment of inertia at crown. Neglect the rib shortening. [BL: Apply| CO: 1|Marks: 7]

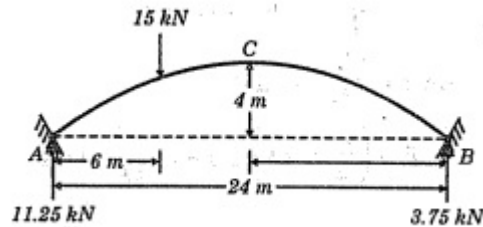


Figure 1

MODULE – II

2. (a) State Castigliano's first theorem. Summarize the terms static indeterminacy and kinematic indeterminacy with one example each. [BL: Understand| CO: 2|Marks: 7]
- (b) Find the force in the member BC of the frame loaded as shown in Figure 2. All the members have the same cross-sectional area. [BL: Apply| CO: 2|Marks: 7]

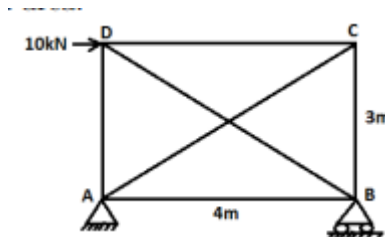


Figure 2

MODULE – III

3. (a) Describe in detail about the procedure of analyzing an indeterminate beam system using slope deflection method. [BL: Understand| CO: 3|Marks: 7]
- (b) Carry out the sway analysis for the frame shown in Figure-3 by moment distribution method and draw the bending moment diagram. Assume constant EI for all members. [BL: Apply| CO: 3|Marks: 7]

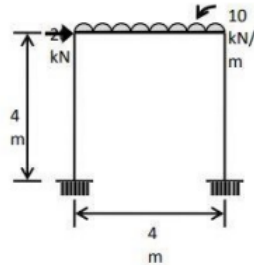


Figure 3

4. (a) Discuss in detail about the procedure of analyzing an indeterminate beam system using moment distribution method. [BL: Understand| CO: 4|Marks: 7]
- (b) Analyse the frame shown in Figure-4 by slope deflection method. Assume EI to be constant and draw BMD. [BL: Apply| CO: 4|Marks: 7]

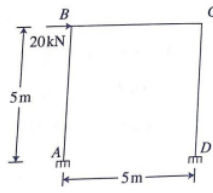


Figure 4

MODULE – IV

5. (a) Summarize the procedure to analyze a indeterminate continuous beam using Kani's method. [BL: Understand| CO: 5|Marks: 7]
- (b) Analyze the continuous beam shown in Figure 5 by Kani's method and draw the bending moment diagram. [BL: Apply| CO: 5|Marks: 7]

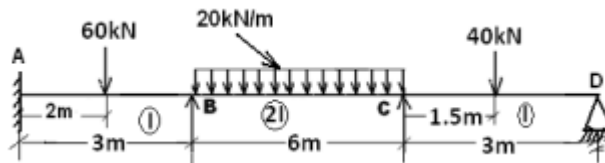


Figure 5

6. (a) Elucidate how continuous beam with support settlements are analyzed by using Kani's method. [BL: Understand| CO: 5|Marks: 7]

- (b) Analyze the continuous beam shown in Figure 6 by Kani's method [BL: Apply| CO: 5|Marks: 7]

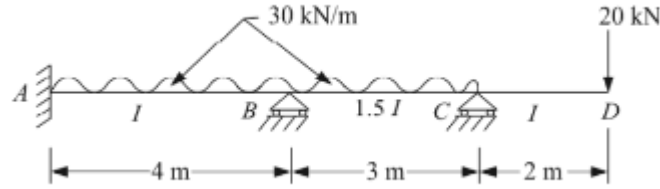


Figure 6

MODULE – V

7. (a) How is the maximum shear force and bending moment determined in case of rolling loads? [BL: Understand| CO: 6|Marks: 7]
- (b) Draw the influence line diagram for shear force and bending moment at D and E in the over hanging beam shown in figure 7 [BL: Apply| CO: 6|Marks: 7]

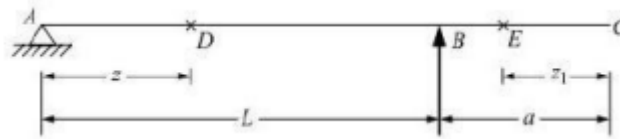


Figure 7

8. (a) Discuss influence line diagrams and their applications. State the difference between shear or moment diagram and influence line diagram. [BL: Understand| CO: 6|Marks: 7]
- (b) The system of concentrated loads as shown in the Figure 8 rolls from left to right on the girder span 15m, 40kN load leading. For a section 4m from left support, determine
- Maximum bending moment
 - Maximum shear force
- [BL: Apply| CO: 6|Marks: 7]

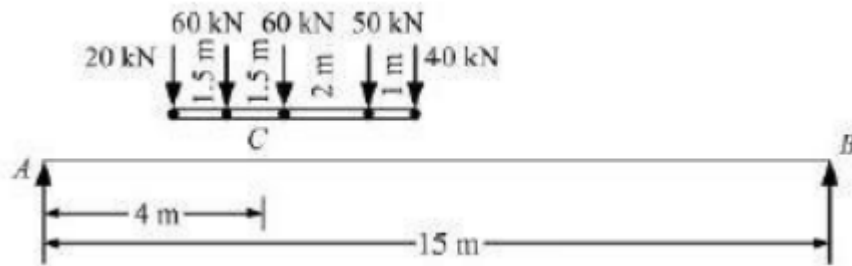


Figure 8

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